Comparative Analysis of OQ Practices

OQ Public Meeting – 3/25/03

Mesa, AZ

Bernie Selig, Consultant, Hartford Steam Boiler

Compared Industries

REGULATOR	INDUSTRY
Federal Railroad Administration/DOT	Railroads
U.S. Coast Guard/DOT	Merchant Fleet
Nuclear Regulatory Commission	Nuclear Power
Occupational Safety & Health Administration/DOL	Petrochemical Industry
Office of Pipeline Safety/DOT	Liquid & Gas Pipelines

Regulatory Requirements for Personnel Qualifications.

1. Cite regulations.
2. Who has to be qualified and how are those individuals selected/identified?
3. Are supervisory and engineering personnel that do not work directly on the facility required to be qualified?
4. Do individuals need to be qualified to perform specific tasks?

5. What evaluation methods may be used to qualify individuals (written tests, oral exam, observation during performance, simulations, knowledge, skill and ability specified)?
6. Is training required as an element of the qualification process?
7. What are the re-qualification intervals and requirements?
8. Can non-qualified individuals perform covered tasks under the direction and Supervision of a qualified person? If so, are there specified time limits.

9. Are there different levels of qualification?
10. What level of documentation and tracking is required? Does the operator have to document who and when each individual performs a covered tasks?
11. How long does the documentation need to be retained by the operator?
12. Are “near misses” documented and if so what remedial measures are required?
13. Are contractors subject to the same qualification requirements as owner / operators?

14. If so, how are contractors or third parties handled? Are the contractors /third parties qualified according to each individual operators requirements or is there an industry standard for contractor qualifications that all operators acknowledge and accept?

15. How are “evaluators” identified? Are they required to have training to be considered authorized evaluators?

16. Does the evaluators credentials, technical expertise need to be documented?

Regulatory Implementation & Effectiveness

1. How does regulator implement and enforce the regulations/statutes?
2. Do they use protocols, check lists, standards, criteria for personnel qualifications?
3. How do they determine the effectiveness of the regulations and the owner/operators qualification program?
4. Does the industry and or the regulator keep metrics on operator error, etc.?

5. Are there performance measurement requirements of the operator for qualifications? If so, what are they?

6. What training, qualifications, credentials, etc. are required of the inspectors and inspectors / auditors who review operators programs?

7. To what extent and by what means are the results of regulatory inspections made available and to whom?

8. What is the safety record of the industry?

9. Characterize the risk posed to the public.

Summary of Results – Regulatory Requirements

Who has to be qualified?

All plant personnel, emphasis on control room operators

(Only Locomotive engineers in RR's)

What evaluation methods are used to qualify people?

Written, oral exams, observation, simulators, training.

Knowledge, skill & ability specified in most cases.

Requalification intervals

2 years to as needed.

Are there different levels of qualification

Yes – use tiered approach – most critical jobs, most qualifications required , shortest requalification periods

Are “near misses” documented?

FRA,NRC, OSHA – yes, others not required. PSM requires root cause analysis teams.

Regulatory Implementation

Do Regulators use protocols and checklists?

Yes for 3, OSHA inspections qualitative for OQ.

How do they determine regulatory effectiveness?

Incident analysis, NRC has 4 metrics including incidents

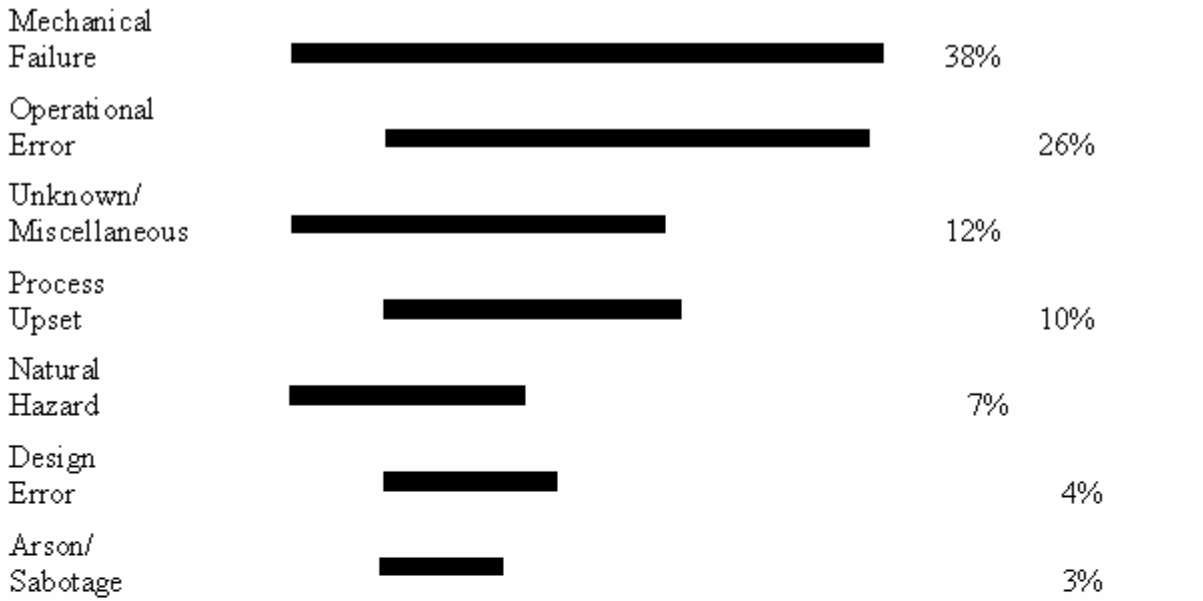
Does the industry or Regulator keep track of operator error?

Yes

Industry Safety Record/Risk Characterization

Industry	Safety Record	Risk Characterization
Merchant Fleet	233 presumed dead in 2002	Significant – safety & environmental
Railroads	>900 fatalities/yr.	High
Nuclear Plants	No fatalities/ injuries (radiological)	Low
Petrochemical	6 fatalities/yr. – Refining 36.5 fatalities/yr. – Chemical	Moderate – safety & environmental
Pipelines	18 fatalities/yr.	Moderate – safety & environmental

Figure 1
Incidents Analysis By Causes
OSHA-Petrochemical Industry 29 CFR 1910



Basic Causes of Employee Error

Employee error has been an important factor in many process accidents, and 61% of all process industry accidents are related to inadequate training. The causes have been identified as:

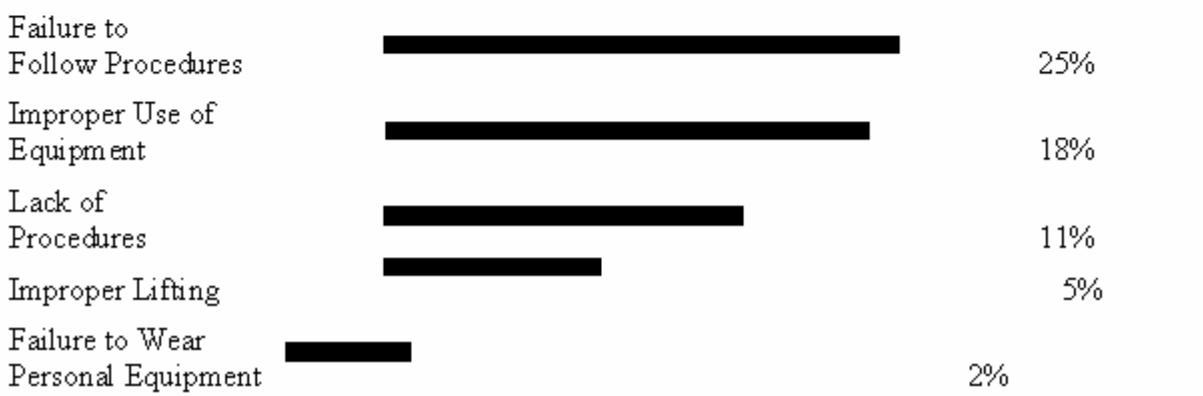


Figure 2
Pipeline Industry
Operator Error Incidents [1]

		1996-1999	Average Number Incidents
Gas Transmission	Number of Operator Error Incidents	21	5.4 incidents/yr.
	Total Incidents	303	
	% Operator Error	6.9%	
Gas Distribution	Number of Operator Error Incidents	44	11 incidents/yr.
	Total Incidents	466	
	% Operator Error	9.4%	
Liquids	Number of Operator Error Incidents	61	16.3 incidents/yr.
	Total Incidents	686	
	% Operator Error	8.9%	

[1] Source – DOT Incidents Data Forms

CONCLUSIONS

- SCADA operator training should be the most extensive
- Several other tasks should have extensive OQ requirements
- OQ requirements for remaining tasks should require less
- Only NRC keeps track of who performs specific tasks

- Knowledge, skills & ability must be demonstrated
- Management of change a significant requirement
- Incidents “by cause” should be the only metric
- Encourage Operators to do root cause analysis
- Industry develop an OQ consensus standard